

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-254. (Canceled).

255. (New) An apparatus for use as a hydrocarbon combustion gas generator comprising:

a first combustion chamber in which a first combustion of fuel and oxidizer can be performed to produce an incomplete combustion product, the first combustion chamber having an inlet end and an outlet end;

control and metering means for separately metering a fuel and an oxidizer into the first combustion chamber to achieve an incomplete combustion of the fuel in the first chamber;

a second combustion chamber in which a second combustion of fuel and additional oxidizer can be performed to produce a second combustion product, the second combustion chamber having an inlet end and an outlet end, wherein the inlet end of the second combustion chamber is in fluid communication with the outlet end of the first combustion chamber;

control and metering means for metering additional oxidizer into the second chamber combustion chamber to further combust fuel in the second chamber;

a means for metering into the second combustion chamber the incomplete combustion product produced in the first combustion chamber; and

a heat exchanger means for cooling the first and second combustion chambers and for optionally converting cooling water to steam, wherein the cooling water and steam are maintained separate from combustion gases produced by the first and second combustions.

256. (New) The apparatus of claim 255, wherein the means for metering into the second combustion chamber the incomplete combustion product produced in the first combustion chamber comprises a plurality of tubular ports.

257. (New) The apparatus of claim 255, further comprising a heat exchanger means for cooling the means for metering the incomplete combustion product produced in the first combustion chamber, wherein the cooling water is maintained separate from combustion gases produced by the first combustion.

258. (New) The apparatus of claim 255, wherein the second combustion is a complete combustion.

259. (New) The apparatus of claim 255, wherein unmetered air is not permitted to mix with the fuel or the oxidizer in the first and second combustion chambers.

260. (New) The apparatus of claim 255, wherein the control and metering means for separately metering a fuel and an oxidizer into the first combustion chamber comprises a plurality of orifices that approximate the inlet end of the first combustion chamber.

261. (New) The apparatus of claim 260, wherein the fuel, the oxidizer, the incomplete combustion product, or all three, are metered into each respective combustion chamber in an angled manner, resulting in at least one point of impingement between the fuel and the oxidizer or between the incomplete combustion product and the oxidizer.

262. (New) The apparatus of claim 255, wherein the heat exchanger means comprises a plurality of tubes forming one or more tube assemblies, having at least one cooling water inlet and at least one steam outlet.

263. (New) The apparatus of claim 262, wherein the one or more tube assemblies form walls defining at least one of the combustion chambers.

264. (New) The apparatus of claim 255, wherein the control and metering means for separately metering a fuel into the first combustion chamber is adapted to separately meter two or more fuel types into the first combustion chamber.

265. (New) The apparatus of claim 255, wherein air is not permitted to mix with the cooling water or steam in the heat exchanger means.

266. (New) The apparatus of claim 255, further comprising:

a third combustion chamber in which a third combustion of fuel and additional oxidizer can be performed to produce a third combustion product, the third combustion chamber having an inlet end and an outlet end, wherein the inlet end of the third combustion chamber is in fluid communication with the outlet end of the second combustion chamber;

control and metering means for metering additional oxidizer into the third combustion chamber to further combust fuel in the third chamber; and

additional heat exchanger means for cooling the third combustion chamber and for optionally converting cooling water to steam, wherein the cooling water and steam are maintained separate from combustion gases produced by the third combustion.

267. (New) The apparatus of claim 266, further comprising a means for metering into the third combustion chamber the second combustion product, wherein the second combustion product is an incomplete combustion product.

268. (New) The apparatus of claim 255, further comprising an electronic igniter system or other means for igniting the fuel in the first combustion chamber.

269. (New) The apparatus of claim 255, further comprising a source of oxidizer.

270. (New) The apparatus of claim 269, wherein the oxidizer is a liquid oxidizer.

271. (New) The apparatus of claim 269, wherein the oxidizer is selected from the group consisting of LOX, O, O₃, H₂O₂, and HAN, and combinations thereof.

272. (New) The apparatus of claim 255, further comprising a source of one or more fuels.

273. (New) The apparatus of claim 272, wherein at least one fuel is in solid particulate form.

274. (New) The apparatus of claim 273, wherein the solid particulate fuel comprises plastic, rubber, or other waste materials.

275. (New) The apparatus of claim 273, wherein the solid particulate fuel has a particle size ranging from about 31 to about 2300 microns.

276. (New) The apparatus of claim 272, wherein at least one additional fuel is a liquid or gaseous fuel.

277. (New) The apparatus of claim 255, wherein from about 97% to about 100% of the fuel metered into the first combustion chamber is combusted by the apparatus.

278. (New) A system for generating electricity comprising:

the apparatus of claim 255, wherein the apparatus generates steam; and
an electrical power-generating device powered by the steam.

279. (New) The system of claim 278, wherein the steam is a superheated steam, dry saturated steam, or a combination of both.

280. (New) The system of claim 278, wherein the electrical power-generating comprises a steam-driven turbine.

281. (New) The system of claim 278, which can produce from 1 megawatt to 600 megawatts of electrical power per day.

282. (New) The system of claim 278, which is a cogeneration system, a trigeneration system, or a quadgeneration system.

283. (New) A process for combusting a fuel comprising:

supplying at least one fuel to the apparatus of claim 255;
supplying at least one oxidizer to said apparatus; and
combusting said fuel and said oxidizer in said apparatus.

284. (New) The process of claim 283, wherein the first combustion occurs at a temperature ranging from about 1,200°F to about 5,800°F, at a pressure ranging from about 500 psig to about 1,500 psig and during a period of time ranging from about 0.025 seconds to about 10 seconds.

285. (New) The process of claim 283, wherein the second combustion occurs at a temperature ranging from about 3,000°F to about 5,800°F, at a pressure ranging from about 300 to about 1,500 psig and during a period of time ranging from about 0.025 to about 10 seconds.

286. (New) The process of claim 283, wherein the oxidizer comprises LOX.

287. (New) The process of claim 283, wherein the fuel comprises a non-waste material.

288. (New) The process of claim 287, wherein the non-waste material comprises wood, coal, hydrogen, methane, ethane, butane, propane, natural gas, gasoline, diesel fuel, kerosene, fuel oil, methanol, alcohol, a product that contains plastic, mixed plastic or plastic resin, or a combination thereof.

289. (New) The process of claim 283, wherein the combustion gases produced by the first and second combustions contain substantially no mercury, SO, SO₂, SO₃, NO, NO₂, N₂O, CO, CH₄, HCl or dioxin.

290. (New) A method for disposing of hazardous or waste materials comprising:

supplying a first fuel to the apparatus of claim 255, wherein the first fuel comprises at least one hazardous or waste material;

supplying at least one oxidizer to said apparatus; and
combusting said fuel and said oxidizer in said apparatus.

291. (New) The method of claim 290, wherein the hazardous material comprises infectious medical waste, biological or chemical weapons, components thereof, or a container therefor.

292. (New) The method of claim 290, wherein the waste material comprises scrap tires, plastic packaging materials, carpet scraps, low-density polyethylene, high density polyethylene, or components thereof.

293. (New) The method of claim 292, wherein the waste material comprises carpet scrap and high-density polyethylene, and further comprising supplying to the apparatus a second fuel comprising hydrogen.

294. (New) The method of claim 293, wherein the combusting said fuels and said oxidizer produces between about 19,200 BTUs per pound of said fuels and about 32,600 BTUs per pound of said fuels.

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PRELIMINARY AMENDMENT

295. (New) The method of claim 293, wherein the carpet scrap is present in the combined first and second fuels in an amount ranging from about 27% to about 48% by weight of the fuels, the hydrogen is present in the combined first and second fuels in an amount ranging from about 23% to about 38% by weight of the fuels, and the high-density polyethylene is present in the combined first and second fuels in an amount ranging from about 25% to about 40% by weight of the fuels.